CLASSIFICATION OF THE ENTOMOPHILOUS WASPS, OR THE SUPERFAMILY SPHEGOIDEA.

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Family XXIII.—Nyssonidæ.

Anyone with the use of my table of families ought readily to recognize any wasp falling in this family, and especially after reading my remarks under the family Mellinidæ. The only group that could possibly cause trouble or confusion would be the subfamily *Gorytinæ*, which closely resembles the *Mellinidæ*, but which may be easily separated from the latter by paying close attention to the shape of the first abdominal segment and examining the mesopleura for the mesosternal suture or carina.

The family Nyssonidæ may be divided into four distinct groups, which I have designated as subfamilies, and which are easily distinguished by the characters made use of in the following table :

Table of Subfamilies.

Marginal cell always pointed at apex, never truncate, and without an appendage; antennæ inserted far above the clypeus, always away from the clypeal suture.

Front wings with the second cubital cell broadly sessile, never triangular or petiolate, and receiving both recurrent nervures; mesopleural furrow usually deeply and sharply defined, complete ..... Subfamily I., Gorytinæ.

Front wings with the second cubital cell petiolate, rarely triangular, sessile; mesopleural suture wanting or subobsolete, evanescent posteriorly.

Metathorax with the superior hind angles unarmed, rounded or obtuse; pronotum dorsally not short, subquadrate; forms elongate ..... Subfamily II., Alysoninæ.

Metathorax with the superior hind angles always acute or produced into stout teeth or spines; pronotum dorsally short, narrowly transverse; forms broad, robust ..... Subfamily III., Nyssoninæ.

Marginal cell always broadly truncate at apex, with an appendage; antennæ inserted close to the clypeus, or very close to the clypeal suture ..... Subfamily IV., Astatinæ.

Subfamily I.—Gorytinæ.

This subfamily approaches nearest to the Mellinidæ and is the only one that could possibly be confused with it. The characters of the first abdominal segment and of the mesopleura, already pointed out, will, however, readily separate it from the Mellinidæ.

From the other subfamilies, into which this family is divided, it is separated by the *sessile second cubital cell*, and, as a rule, by the distinct mesosternal suture.

The genera are somewhat numerous and closely allied, but may be distinguished by the use of the following table :

Table of Genera.

Mesosternum not separated from the mesopleura by a longitudinal suture or carina, the latter entirely wanting or indicated only slightly anteriorly ; cubitus in hind wings originating *beyond* the transverse median nervure, very rarely interstitial or nearly.....4.

Mesosternum always distinctly separated from the mesopleura by a longitudinal suture or carina (sometimes difficult to discern on account of the pubescence).

Cubitus in hind wings originating *before* the transverse median nervure, or interstitial or nearly.....2.

Cubitus in hind wings originating *far beyond* the transverse median nervure ; stigma not well developed, the radius originating from its apex.....3.

2. Cubitus in hind wings originating *far* before the transverse median nervure.

Triangular area of metanotum sharply defined by grooved lines, the enclosure smooth, polished, not striate, or at most only slightly striate laterally at base. ...Pseudoplisus, Ashm., n. g. (Type G. floridanus, Fox.)

Cubitus in hind wings interstitial or originating only a little before the transverse median nervure.

Cubitus in hind wings most frequently originating a little before the transverse median nervure ; triangular area of metanotum always well defined, the enclosure always longitudinally striate.....Hoplisus, Lepel.

Cubitus in hind wings *interstitial;* triangular area of metanotum not sharply defined, but striate or coarsely rugose.....Hoplisoides, Gribodo.

3. Submedian cell longer than the median ; second cubital cell receiving both recurrent nervures ; anterior tarsi in ♀ with a comb ; triangular area of metathorax well defined, with some striæ at base..... Harpactus, Jurine.
= Dienoplus, Fox.

4. Second cubital cell not receiving both recurrent nervures ; hind tibiæ serrate ..... 8.

Second cubital cell receiving both recurrent nervures, or rarely with the first recurrent interstitial with the first transverse cubitus ; hind tibiæ not serrate, although sometimes spinous.

Stigma not well developed, truncate at apex, the radius originating from its extreme apex..... 7.

Stigma well developed, not truncate at apex, the radius originating before its apex ..... 5.

5. Anterior tarsi in ♀ *with* a comb.. ..... 6.

Anterior tarsi in ♀ *without* a comb ; cubitus in hind wings originating far *beyond* the transverse median nervure.

First ventral segmemt *without* a carina or elevation, the second without an emargination at base, when viewed from the side, normal, not elevated..... Kaufmannia, Radoszk.

First ventral segment *with* a carina or elevation, the second abruptly truncate or with an emargination at base and elevated, so as to appear triangular when viewed from the side..... Gorytes, Latreille.

6. Transverse median nervure in front wings joining the median vein far *beyond* the origin of the basal nervure..... Lestiphorus, Lepel.

Transverse median nervure in front wings *interstitial* with the basal nervure.

Body marked with yellow; first abdominal segment above convex ; scutellum with a transverse impressed line at base, but the same not crenulate..... Clitemnestra, Spinola.

Body wholly black ; first abdominal segment with a hump-like elevation above ; scutellum *with* a transverse, crenulate furrow at base. (New Zealand)..... Argogorytes, Ashm., n. g.
(Type G. carbonarius, Smith.)

7. Submedian cell in front wings longer than the median ; antennæ filiform or subclavate ; pulvilli normal ; abdomen mostly rufous.

Cubitus in hind wings originating distinctly beyond the transverse median nervure ..... Harpactus, Jurine.

Cubitus in hind wings *interstitial* with the transverse median nervure ..... Agraptus, Wesmael.

8. First recurrent nervure *interstitial* or nearly, the second recurrent received by the second cubital cell near its apex; anterior tarsi in ♀ *without* a comb.....Miscothyris, Smith.

SUBFAMILY II.—Alysoninæ.

This is a natural group, of small extent, and represented by only two genera, found in both hemispheres.

The species are somewhat narrowed and elongate, and superficially resemble the *Pseninæ*, in the family Pemphredonidæ, although structurally they are widely separated.

Our species have been monographed recently by Mr. Wm. J. Fox.

The genera may be distinguished as follows:

Table of Genera.

Submedian cell in front wings much longer than the median, the transverse median nervure joining the median vein far *beyond* the origin of the basal nervure; abdomen with a pale spot at each side of the second segment..... Didineis, Wesmael.

Submedian cell of front wings a little shorter than the median, the transverse median nervure joining the median vein a little *before* the basal nervure; abdomen without a pale spot on each side of the second segment..... Alyson, Jurine.

SUBFAMILY III.—Nyssoninæ.

This is also a natural and compact group, allied to the *Alysoninæ*, but markedly distinct in the more robust form and by the toothed metathoracic angles. In this last characteristic it shows some affinity with the Stizidæ, but otherwise—in mouth-parts, venation of wings, and in its thoracic characters—the subfamily is quite distinct and easily separated.

Our species in this group have been monographed recently by Mr. Wm. J. Fox, who, however, has suppressed all genera and placed all our species in the genus *Nysson*, Latr. Mr. Fox's work is excellent, but I do not believe in such wholesale lumping, and in the following table I have restored all of these genera, making use of such salient characters as I believe will render their recognition easy and certain.

Table of Genera.

Front wings with two cubital cells, the third transverse cubitus always wanting..... 5.

Front wings with three cubital cells, the second always petiolate; if with only two cubital cells, the second transverse cubitus wanting.

Two cubital cells, the first receiving both recurrent nervures.....3.
Three cubital cells.....2.

2. Second cubital cell receiving only one recurrent nervure.....4.
Second cubital cell receiving both recurrent nervures.

Cubitus in hind wings originating *before* the transverse median nervure or interstitial with it; hind tibiæ usually spinous, but not serrate on hind margin; scutellum normal; apex of abdomen in ♂ terminating in 2 teeth.....Nysson, Latreille.

Cubitus in hind wings originating beyond the transverse median nervure.

Hind tibiæ with feeble spines, never serrate; lateral margins of scutellum sometimes more or less margined, the postscutellum normal; apex of ♂ abdomen terminating in 2 teeth.....Brachystegus, Costa.

Hind tibiæ strongly *serrated* on hind margin, and also more or less spinous; lateral margins of scutellum more or less strongly reflexed, the postscutellum bilobed; apex of ♂ abdomen terminating in 4 teeth.....Paranysson, Guerin.

3. Cubitus in hind wings originating *beyond* the transverse median nervure, the latter short, straight, perpendicular; hind tibiæ on outer face armed with 4 teeth; pygidium very long, with the lateral margins denticulate.....Metanysson, Ashm., n. g.
(Type N. Solani, Ckll.)

4. Second cubital cell receiving only one recurrent nervure—*the second*, the first recurrent nervure received by the first cubital cell near its apex; posterior coxæ armed with a spine or tubercle at apex; abdomen normal.....Helioryctes, Smith.
(Type H. melanopyga, Smith.)

Second cubital cell receiving only one recurrent nervure—*the first*, the second recurrent nervure received by the third cubital cell far beyond the second transverse cubitus; posterior coxæ unarmed; hind tibiæ and scutellum as in *Nysson;* abdomen with ventral segments 4–6 each with a lateral tooth, apex of abdomen in ♂ 3-dentate.....Foxia, Ashm.

5. Second cubital cell triangular, but not petiolate, the first recurrent nervure received by the first cubital cell near its apex, the second recurrent interstitial; metathorax with the superior hind angles produced into strong stout spines.....Acanthostethus, Smith.

Second cubital cell petiolate, receiving both recurrent nervures; metathoracic teeth small, acute; scutellum normal; legs smooth, not spinous..... Hyponysson, Cresson.

SUBFAMILY IV.—Astatinæ.

Distinguished from all the other subfamilies by the truncate, appendiculate marginal cell in the front wings, and by the antennæ being inserted far anteriorly, close to the clypeal suture.

Fox has correctly pointed out the close relationship between his genus *Diploplectron* and *Dinetus*, Jurine, but both genera are too closely related to *Astatus* to warrant their separation as a distinct tribe.

Four genera fall into this group, separated as follows:

Table of Genera.

Marginal cell along the costa, much longer than the stigma; eyes in ♂ holoptic; front wings with three cubital cells..... 3.

Marginal cell, along the costa not longer than the stigma, most frequently shorter; eyes in ♂ normal, not holoptic.

Front wings with three cubital cells..... 2.

Front wings with two cubital cells.

Clypeus at apex in ♀ 3-dentate; tarsal comb distinct; all tibiæ spinous: antennæ in ♂ twisted, the scape much swollen, the flagellar joints 1–6 compressed; anterior tarsi flattened..... Dinetus, Jurine.

2. Clypeus medially convex, slightly produced anteriorly, without teeth; tarsal comb long, distinct; tibiæ spinous; antennæ filiform, similar in both sexes..... Diploplectron, Fox.

3. Second cubital cell not receiving both recurrent nervures, the first recurrent nervure *interstitial* with or received a little before the first transverse cubitus; marginal cell not quite twice as long as wide; eyes in ♂ *not* extending to base of mandibles; pronotum in ♀ strongly developed and not hidden beneath the anterior margin of the mesonotum; first cubital cell much longer than the second or third, nearly as large as both united..... Dryudella, Spinola.

Second cubital cell receiving both recurrent nervures; marginal cell at least twice as long as wide, and still longer in the ♂; eyes in ♂ extending to the base of mandibles; pronotum in both sexes deeply impressed beneath the anterior margin of the mesonotum; first cubital cell only slightly different from the second or third..... Astatus, Latreille.

North American Species.

Subfamily I.—*Gorytinæ*.

(1) Pseudoplisus, Ashmead.
- (1) P. abdominalis, Cr., ♀ ♂.
  = propinquus, Cr.
- (2) P. aequalis, Hdl., ♀ ♂.
- (3) P. alpestris, Cam., ♀ ♂.
- (4) P. alticola, Cam., ♀ ♂.
- (5) P. balteatus, Cam., ♀.
- (6) P. bipartitus, Hdl., ♀ ♂.
- (7) P. cameronis, Hdl., ♀ ♂.
- (8) P. centralis, Cam., ♀.
- (9) P. divisus, Smith, ♂.
- (10) P. fasciatus, Fox, ♀.
- (11) P. floridanus, Fox, ♀.
  = foveolatus, Fox.
- (12) P. fulvipennis, Smith.
- (13) P. fuscipennis, Cam., ♀
- (14) P. montanus, Cam., ♂.
- (15) P. notabilis, Hdl., ♀ ♂.
- (16) P. phaleratus, Say, ♀ ♂.
  = flavicornis, Pack.
  = modestus, Cr.
  = rufoluteus, Pack.
- (17) P. rubiginosus, Hdl., ♀ ♂.
- (18) P. Smithii, Cr., ♀.
- (19) P. splendidus, Hdl., ♀.
- (20) P. venustus, Cr., ♀ ♂.

(2) Hoplisus, Lepeletier.
- (1) H. albosignatus, Fox.
- (2) H. angustatus, Prov.
- (3) H. atricornis, Pack, ♂.
- (4) H. atrifrons, Fox, ♀ ♂.
- (5) H. canaliculatus, Pack.
- (6) H. cayenensis, Spin., ♀ ♂.
- (7) H. compactus, Fox.
- (8) H. decorus, Fox, ♀ ♂.
- (9) H. diversus, Fox, ♀.
- (10) H. fasciatipennis, Cam., ♀.
- (11) H. fuscus, Tischb., ♀ ♂.
- (12) H. geminus, Hdl., ♀ ♂.
- (13) H. maculipes, Cam.
- (14) H. nevadensis, Fox, ♀ ♂.
- (15) H. Provancheri, Hdl., ♂.
  = laticinctus, Prov.
- (16) H. ruficornis, Prov., ♀ ♂.
- (17) H. simillimus, Smith, ♀ ♂.
  = eppipiata, Prov.
- (18) H. vicinus, Hdl.

(3) Hoplisoides, Gribodo.
- (1) H. armatus, Prov.
- (2) H. asperatus, Fox.
- (3) H. bigeloviæ, Ckll.
- (4) H. barbatulus, Hdl., ♂.
- (5) H. confertus, Fox.
- (6) H. Coquiletti, Fox.
- (7) H. costalis, Cr.
- (8) H. dentatus, Fox.
- (9) H. denticulatus, Pack.
- (10) H. gracilis, Pattn.
- (11) H. hamatus, Hdl., ♂.
  = micantula.
- (12) H. laminiferus, Fox, ♂.
- (13) H. maculipennis, Cam.
- (14) H. mexicanus, Cam., ♀.
- (15) H. microcephalus, Hdl.
- (16) H. mirandas, Fox.
- (17) H. nebulosus, Pack.
- (18) H. Pergandii, Hdl.
- (19) H. placidus, Smith.
  = rufipes, Sm
- (20) H. punctifrons, Cam.
- (21) H. pygidialis, Fox, ♀.
- (22) H. robustus, Hdl., ♀.
- (23) H. rugosus, Pack.
- (24) H. seminiger, Dahlb.
- (25) H. scitulus, Cr.
- (26) H. sepulchralis, Hdl.
- (27) H. spilopterus, Hdl.
- (28) H. tricolor, Cress., ♀ ♂.

(4) Harpactus, Jurine.
  = Dienoplus, Fox.
- (1) H. Cockerellii, Ashm., ♀.
- (2) H. Howardii, Ashm., ♀.
- (3) H. insularis, Cr.
- (4) H. lateritius, Hdl., ♀ ♂.
- (5) H. mendicus, Hdl., ♀ ♂.
  = pictifrons, Fox.
- (6) H. tristrigatus, Fabr., ♀ ♂.

(7) H. (?) insolitus, Fox, ♂. (Gorytes.)
(5) Kaufmannia, Radoszk.
(6) Gorytes, Latreille.
(1) G. campestris, Linné, ♀ ♂.
(2) G. costalis, Cr., ♀
(3) G. mystaceus, L., ♀ ♂.
(4) G. nigrifrons, Smith, ♀ ♂.
(5) G. (?) piceus, Hdl., ♂.
(6) G. (?) spilographus, Hdl.
(7) Lestiphorus, Lepel.
(8) Clitemnestra, Spinola.
(9) Argogorytes, Ashmead.
(10) Agraptus, Wesmael.
(11) Miscothyris, Smith.

Subfamily II.—*Alysoninæ.*

(12) Didineis, Wesmael.
(1) D. aculeata, Cr., ♂. (Alyson.)
(2) D. nodosa, Fox, ♂.
(3) D. peculiaris, Fox, ♀ ♂.
(4) D. solidescens, Scudd. (Fosil.)
(5) D. texana, Cr., ♀ ♂.
(13) Alyson, Jurine.
(1) A. conicus, Prov., ♂.
(2) A. Guignardii, Prov., ♀ ♂.
(3) A. melleus, Say, ♀ ♂.
(4) A. oppositus, Say, ♀ ♂.
(5) A. radiatus, Fox, ♀ ♂.
(6) A. striatus, Fox, ♂.
(7) A. triangularis, Fox.
(8) A. triangulifer, Prov., ♂.

Subfamily III.—*Nyssoninæ.*

(14) Nysson, Latreille.
(1) N. spinosus, Forst., ♀ ♂.
(2) N. plagiatus, Cr., ♀ ♂.
(3) N. Frey-Gessneri, Hdl., ♀ ♂.
(4) N. auronotatus, Say, ♀ ♂.
(5) N. aequalis, Pattn., ♀ ♂.
(6) N. compactus, Cr., ♀ ♂.
(7) N. subtilis, Fox, ♂.
(8) N. rusticus, Cr., ♀ ♂.
(9) N. simplicicornis, Fox, ♂.
(10) N. lateralis, Pack., ♂.
(11) N. tristis, Cr., ♂.
(12) N. fidelis, Cr., ♀ ♂.
(13) N. rufiventris, Cr., ♀ ♂.
(14) N. nigripes, Prov., ♂.
(15) N. quinquespinosus, Say, ♀ ♂.
(16) N. zapotecus, Cr., ♀.
(17) N. Aztecus, Cr., ♀.
(15) Brachystegus, Costa.
(1) B. opulentus, Gerst., ♀ ♂.
(2) B. mellipes, Cr., ♀ ♂.
(3) B. bellus, Cr., ♀.
(4) B. tuberculatus, Handl., ♀ ♂
(5) B. basilaris, Cr., ♀.
(6) B. pumilus, Cr., ♂.
(7) B. albomarginatus, Cr., ♀ ♂
(8) B. moestus, Cr., ♀.
(16) Paranysson, Guérin.
(1) P. texanus, Cr., ♀ ♂.
(2) P. fuscipes, Cr., ♀ ♂.
(3) P. mexicanus, Cr., ♀ ♂.
(4) P. dives, Handl., ♀ ♂.
(5) P. armatus, Cr., ♀ ♂.
(17) Metanysson, Ashmead.
(1) M. Solani, Ckll.
(18) Heliorycres, Smith.
(19) Foxia, Ashmead.
(1) F. pacifica, Ashm., ♀ ♂.
(20) Acanthostethus, Smith.
(21) Hyponysson, Cresson.
(1) H. bicolor, Cr., ♀.

Subfamily IV.—*Astatinæ.*

(20) Dinetus Jurine.
(21) Diploplectron, Fox.
(1) D. ferrugineus, Ashm., ♀.
(2) D. brunneipes, Cr., ♀ ♂.
(3) D. bidentatus, Ashm., ♀.
(4) D. Foxii, Ashm., ♀.
(22) Dryudella, Spinola.
(23) Astatus, Latreille.
(1) A. unicolor, Say, ♀ ♂.
(2) A. occidentalis, Cr., ♀ ♂.
(3) A. Leustromi, Ashm., ♀.
(4) A. nubeculus, Cr., ♀ ♂. = nigrospilosus, Cr.
(5) A. asper, Fox, ♀ ♂.
(6) A. bicolor, Say, ♀ ♂.
(7) A. pygidialis, Fox, ♀.
(8) A. nevadicus, Cr., ♀ ♂.

(9) A. montanus, Cr., ♀.
(10) A. elegans, Cr., ♀ ♂.
(11) A. bellus, Cr., ♂.
(12) A. coeruleus, Cr., ♂.
(13) A. albovillosus, Cam., ♀.
(14) A. Sayi, Fox, ♀.
(15) A. strigosa, Kohl, ♀.
(16) A. apicipennis, Cam.
(17) A. tinctipennis, Cam., ♀.
(18) A. Kohlii, Cam., ♀.
(19) A. picta, Kohl, ♂.
(20) A. mexicana, Cr., ♂.
(21) A. alpestris, Cam., ♀.
(22) A. insularis, Cr., ♀.

TABLES FOR THE DETERMINATION OF THE GENERA OF COCCIDÆ.

BY T. D. A. COCKERELL, N. M. AGR. EXP. STA.

(*Continued from page 279.*)

LECANIINÆ.

Secretion of ♀ more or less cottony.....Series I.
Secretion of ♀ waxy, glassy, or horny.....Series II.
Adult ♀ naked, or covered only by a film of secretion.....Series III.

Of course it must be understood that the expressions "glassy," "horny," and "cottony," refer only to the *appearance* of the secretion, not to its true nature.

SERIES I.

Female resembling a flat *Lecanium*, secreting an ovisac, which is elongated posteriorly, but does not at all cover the insect.....1.
Female surrounded by cottony secretion, but naked dorsally.....4.
Female completely or almost completely covered by a sac of cottony or felted secretion.....5.
Female secreting dorsally a thick mass of white waxy threads, which however do not cover the middle of the back; round the sides are threads spreading in all directions; antennæ six-jointed, 3 much the longest; legs rather slender; tibia longer than tarsus.....*Ceronema*, Mask.
Female oval or elliptical, with a loosely felted secretion, especially in the second stage, but absent or inconspicuous in the adult; antennæ 7-jointed: tarsus longer than tibia; margin with a fringe.....*Eriochiton*, Mask.

1. Female triangular, ovisac very slightly developed, a mere fringe round the hind margin.....*Protopulvinaria*, Ckll.
Female oval or suboval.....2.